ORIGINAL ARTICLE

Clinical profile of stroke in diabetics and non-diabetic and its outcome – A cross-sectional study

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Background: Stroke in diabetes is 1.5–3 times more likely as compared to non-diabetics. Diabetes mellitus is a risk factor for both an excess incidence and mortality of stroke. **Aims:** The aim of the study was to study and determine the distinctive clinical profile of stroke in diabetics and non-diabetics and it's outcome. **Objectives:** The objective of the study was to study and compare the clinical profile of stroke with respect to age, sex, stroke type, stroke severity, and prevalence of risk factors in the diabetics and non-diabetics **Materials and Methods:** The present cross-sectional study was carried out at the Medicine Department of Rohilkhand Medical College and Hospital in Bareilly, Uttar Pradesh. **Results:** Mean NIHSS of diabetic patients was 15.15 ± 6.66 and in non-diabetic patients, mean NIHSS was 10.85 ± 6.33. There was significant difference in mean NIHSS of patients in diabetic and non-diabetic group. Out of 20 patients in diabetic group, 5 (25%) were died, 5 (25%) had good outcome, 3 (15%) had moderate outcome, and 7 (35%) had poor out come and out of 20 patients in non-diabetic group, 3 (15%) were died, 8 (40%) had good outcome, 7 (35%) had moderate outcome, and 2 (10%) had poor outcome. There was significant difference in outcome of patients in diabetic and non-diabetic group. **Conclusion:** This study shows an association in sugar value and the outcome of stroke. Higher elevated blood glucose level has increased mortality and high risk of poor functional recovery.

KEY WORDS: Diabetics, Non-diabetics, Stroke,

INTRODUCTION

Stroke is defined as an abrupt onset of a neurological deficit that is attributable to a focal vascular cause.[1] Stroke is second most common cause of mortality and the third most common cause of disability worldwide.[2] The majority (about 85%) of stroke is ischemic. The reminder results from primary hemorrhage either intracerebral or into the subarachnoid space.

Stroke in diabetes is 1.5-3 times more likely as compared to non-diabetics.[3] Diabetes mellitus is a risk factor for both an excess incidence and mortality of Stroke.[4]

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Diabetes potentiates stroke by favoring thrombosis by increasing concentration in blood of prothrombotic factors such as fibrinogen and von willebrand factor. It also increases platelet adhesiveness. Fibrinolytic capacity is decreased through increased concentrations of plasminogen activator inhibitor Type 1.

Diabetes also favors atherogenesis because of various lipid abnormalities such as hypertriglyceridemia, low high-density lipoprotein (HDL) cholesterol, and high triglyceride-enriched HDL. Glycosylation of lipoproteins and oxidation of lipoproteins lead to atheroma formation.

The relative risk of stroke in diabetics approximately doubled as compared to patients without diabetes. Clinical profile of stroke is different in diabetics compared in non-diabetics in many aspects.

Hyperglycemia itself is independent risk factor predicting high morbidity and mortality irrespective of age, type, and severity of stroke.[5]

The pattern of stroke in diabetes is different than non-diabetes. Diabetes increases risk of stroke in younger patients as well as women.[6]

MATERIALS AND METHODS

Place of Study

This study was conducted in patients attending outpatient department and inpatient department in Department of Medicine, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh.

Type of Study

This was a cross-sectional study.

Duration of Study

The proposed study will be conducted from the November 1, 2020, to October 31, 2021.

Sample Size

This study was conducted on 40 patients with stroke (out of which 20 patients were diabetic or found to have diabetes, and 20 were non-diabetic stroke patients). The sample size is derived by.[7]

Following formula

$n = 4 \times p \times q/l^2$
n = Sample size
P = Estimated prevalence
Q = 100-P
l=acceptable absolute error i.e., 10%
$n = 4 \times 90 \times (100–90)/10 \times 10 = 36 \sim 40$

Subjects of Study

Patients who were be admitted with history of acute stroke and confirmed by thorough physical examination and radiological investigation to have stroke, and satisfied the inclusion and exclusion criteria were studied.

Inclusion Criteria

All stroke patients with and without diabetes were included in the study.

Exclusion Criteria

1. Patients receiving diabetogenic drugs
2. Patients presenting with recurrent stroke
3. Patients presenting with transient ischemic attack and hemorrhagic stroke
4. Patients having severe stroke who died before it could be established whether they had diabetes or not.

Method

A hospital-based, prospective, and observational study was conducted in Department of Medicine at Rohilkhand Medical College and Hospital, Bareilly, after obtaining clearance from the Institutional ethics Committee. Patients who were admitted with history of acute stroke on the basis of physical examination and CT BRAIN, as per above criteria, were included in the study. After informed consent, a careful history was recorded, detailed general physical and systemic examinations were done. Patient was considered diabetic when the following criteria for diagnosis of diabetes mellitus satisfied or patient are known case of diabetes mellitus.

Criteria for the Diagnosis of Diabetes Mellitus

- Symptoms of diabetes plus random blood glucose concentration ≥ 11.1 mmol/L (200 mg/dL) or
- Fasting plasma glucose ≥ 7.0 mmol/L (126 mg/dL) or
- Hemoglobin A1c $\geq 6.5\%$ c or
- 2-h plasma glucose ≥ 11.1 mmol/L (200 mg/dL) during an oral glucose tolerance test.

Specific investigations (FBS/PPBS/HBA1C/CT Scan and MRI) were done as and when indicated. Details of history, general physical examination, and laboratory investigations reports were noted down from time to time.

Statistical Analysis

- The data were coded and entered; its clearing and compiling was done on a Microsoft Excel spreadsheet and then it was imported into Statistical Package for the Social Sciences version 23.0 for statistical analysis
- Data were analyzed by applying frequency, percentage, mean, standard deviation
- Appropriate statistical tests were applied based on distribution and type of data
- The quantitative data, expressed in means and analyzed by t-test, and proportions through Chi-square test $P < 0.05$ was considered statistically significant.

RESULTS

- Mean NIHSS of diabetic patients was 15.15 ± 6.66 and in non-diabetic patients mean NIHSS was 10.85 ± 6.33. There was significant difference in mean NIHSS of patients in diabetic and non-diabetic group.
- Out of 20 patients in diabetic group, 5 (25%) were died, 5 (25%) had good outcome, 3 (15%) had moderate outcome, and 7 (35%) had poor out come and out of 20 patients in non-diabetic group, 3 (15%) were died, 8 (40%) had good outcome, 7 (35%) had moderate outcome, and 2 (10%) had poor outcome. There was significant difference in outcome of patients in diabetic and non-diabetic group.

COMPARISON OF MEAN NIHSS IN DIABETIC AND NON-DIABETIC PATIENTS

NIHSS	Number	Mean	Std. Deviation	P-VALUE
Diabetic	20	15.15	6.66	**<0.05***
Non Diabetic	20	10.85	6.33	

Outcome	Diabetic		Non Diabetic		P Value
	Diabetic	Diabetic	Non Diabetic	Non Diabetic	
DEATH	5	25%	3	15%	>0.05
GOOD	5	25%	8	40%	
MODERATE	3	15%	7	35%	
POOR	7	35%	2	10%	
Total	20	100%	20	100%	
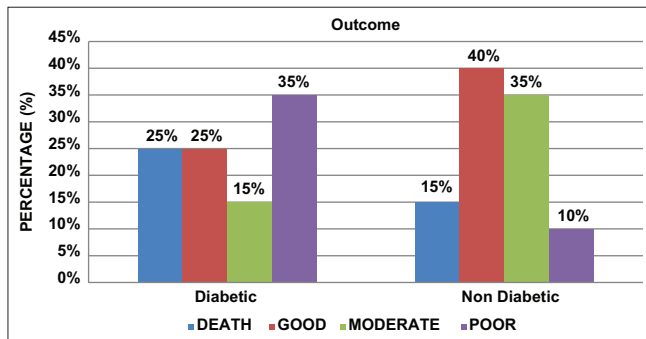
CONCLUSION

This study shows an association in sugar value and the outcome of stroke. Higher elevated blood glucose level has increased mortality and high risk of poor functional recovery.

REFERENCES

1. Smith WS, Johnston SC, Hemphil JC. Cerebrovascular diseases. In: Jameson J, Fauci A, Kasper D, Hauser S, Longo D, Loscalzo J, *et al.* editors. Harrison's Principle of Internal Medicine. 20th ed. United States: McGraw Hill Medical Education; 2018. p. 3068-79.
2. Lozano R, Naghavi M, Foreman K, Lim S, Alvarado M, Andrews K, *et al.* Global regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: A systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012;380:2095-128.
3. Kissela BM, Khoury J, Kleindorfer D, Woo D, Schneider A, Alwell K, *et al.* Epidemiology of ischemic stroke in patients with diabetes: The greater Cincinnati/Northern Kentucky Stroke Study. Diabetes Care 2005;28:355-9.
4. Asplund K, Hägg E, Helmers C, Lithner F, Strand T, Wester PO. The natural history of stroke in diabetic patients. Acta Med Scand 1980;207:417-24.
5. Bruno A, Biller J, Adams HP Jr., Clarke WR, Woolson RF, William LS, *et al.* Acute blood glucose level and outcome from ischemic stroke. Trial of ORG 10172 in Acute Stroke Treatment (TOAST) Investigators. Neurology 1999;52:280-4.
6. Mulnier HE, Seaman HE, Raleigh VS, Soedamah-Muthu SS, Colhoun HM, Lawrenson RA, *et al.* Risk of stroke in people with Type 2 diabetes in the UK: A study using the General Practice Research Database. Diabetologia 2006;49:2859-65.
7. Patibandla S, Appikatla T, Jayasingh K. Study of the severity of stroke at the time of presentation in diabetic patients correlating with glycemic control. Int J Adv Med 2017;4:396-400.